

Appl. Ser. No. 09/530,934

Att. Docket No. 02345/129

Reply to Office Action of April 5, 2004

**AMENDMENTS TO THE CLAIMS:**

Without prejudice, this listing of the claims replaces all prior versions and listings of the claims in the present application:

**LISTING OF CLAIMS:**

1-28. (Canceled).

29. (Currently Amended) A circuit arrangement for data transmission using a multi-level modulation process, the multi-level modulation process using at least one orthogonal function, the circuit arrangement comprising:

a data source for providing a data stream;

a recoder downstream of the data source;

a modulator for selecting signal points of a signal constellation according to at least one respective at least one predetermined and[/or] selected probability so as to optimize a respective at least one signal energy and[/or] a respective signal data rate, the selected signal points each having a defined respective energy, the modulator being connected to an output of the recoder;

a transmission channel, an input of the transmission channel being connected to an output of the modulator;

a demodulator, an input of the demodulator being connected to an output of the transmission channel;

an inverse recoder for executing a first operation inverse to a second operation of the recoder, an input of the inverse recoder being connected to the demodulator;

a data sink, an input of the sink being connected to an output of the inverse recoder;

a temporary storage device including a control/processing unit, the temporary storage device being capable of triggering the recoder to switch between at least two recoding tables so that there is no storage overflow;

a second temporary storage device including a second control/processing unit disposed between the inverse recoder and the sink; and

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a second data sink connected to the second temporary storage device.

30. (Canceled).

31. (Canceled).

<sup>2</sup>  
32. (Currently Amended) A circuit arrangement for data transmission using a multi-level modulation process, the multi-level modulation process using at least one orthogonal function, the circuit arrangement comprising:

a data source for providing a data stream;

a recoder downstream of the data source;

a modulator for selecting signal points of a signal constellation according to at least one respective at least one predetermined and[/or] selected probability so as to optimize a respective at least one signal energy and[/or] a respective signal data rate, the selected signal points each having a defined respective energy, the modulator being connected to an output of the recoder;

a transmission channel, an input of the transmission channel being connected to an output of the modulator;

a demodulator, an input of the demodulator being connected to an output of the transmission channel;

an inverse recoder for executing a first operation inverse to a second operation of the recoder, an input of the inverse recoder being connected to the demodulator;

a data sink, an input of the sink being connected to an output of the inverse recoder;

a temporary storage device capable of triggering the recoder to switch between at least two recoding tables so that there is no storage overflow; and

a second data source for providing the temporary storage with at least one of user data, synchronization data and check data.

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~~33~~<sup>3</sup>. (Previously Presented) The circuit arrangement as recited in claims ~~29~~<sup>1</sup> or ~~32~~<sup>2</sup> wherein the output of the modulator is connected in a buffered manner to the input of the transmission channel.

~~34~~<sup>4</sup>. (Previously Presented) The circuit arrangement as recited in claim ~~33~~<sup>3</sup> wherein the output of the modulator is connected in a buffered manner to the input of the transmission channel via at least one of a temporary register and a buffer.

~~35~~<sup>5</sup>. (Previously Presented) The circuit arrangement as recited in claims ~~29~~<sup>1</sup> or ~~32~~<sup>2</sup> wherein at least one source coding process is used for adapting a data sequence of the signal for the using of the at least one orthogonal basis function.

~~36~~<sup>6</sup>. (Previously Presented) The circuit arrangement as recited in claim ~~35~~<sup>5</sup> wherein the at least one source coding process includes a Huffman method.

~~37~~<sup>7</sup>. (Previously Presented) The circuit arrangement as recited in claims ~~29~~<sup>1</sup> or ~~32~~<sup>2</sup> wherein a first data source provides the signal for transmission and at least one source coding process is used for adapting a data sequence of the signal for the using of the at least one orthogonal basis function, the at least one source coding process including an error-correcting code adapted to the modulation process and a respective transmission channel for protection against transmission errors, error detection characters of the modulation process being inserted using a second data source.

~~38~~<sup>8</sup>. (Previously Presented) The circuit arrangement as recited in claim ~~37~~<sup>7</sup> wherein the error-correcting code includes a block code.

~~39~~<sup>9</sup>. (Previously Presented) The circuit arrangement as recited in claim ~~37~~<sup>7</sup> wherein the error-correcting code includes a convolution code.

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<sup>10</sup>  
40. (Previously Presented) The circuit arrangement as recited in claims <sup>1</sup>29 or <sup>2</sup>32 wherein the signal for transmission includes an encrypted input data stream.

<sup>11</sup>  
41. (Previously Presented) The circuit arrangement as recited in claims <sup>1</sup>29 or <sup>2</sup>32 wherein a first data rate is selected for the transmission channel that is greater than a second data rate of the data stream.

<sup>12</sup>  
42. (Previously Presented) The circuit arrangement as recited in claims <sup>1</sup>29 or <sup>2</sup>32 wherein synchronization data are transmitted during at least one time when no bits are present in the signal for transmission.

<sup>13</sup>  
43. (Previously Presented) The circuit arrangement as recited in claims <sup>1</sup>29 or <sup>2</sup>32 wherein at least one of housekeeping data and user data are transmitted when no bits are present in the signal for transmission.

<sup>14</sup>  
44. (Currently Amended) A method for providing for data transmission using a multi-level modulation process, the multi-level modulation process using at least one orthogonal function, the method comprising:

providing a data stream from a data source, wherein a recoder is downstream of the data source;

selecting, using a modulator, signal points of a signal constellation according to at least one respective at least one predetermined and[/or] selected probability so as to optimize a respective signal energy and/or a respective signal data rate, the selected signal points each having a defined respective energy, the modulator being connected to an output of the recoder, wherein an input of a transmission channel is coupled to an output of the modulator, and an input of a demodulator is coupled to an output of the transmission channel;

executing, using an inverse recoder, a first operation inverse to a second operation of the recoder;

wherein:

an input of the inverse recoder is coupled to the demodulator,

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an input of a data sink is coupled to an output of the inverse recoder,

a temporary storage device includes a control/processing unit and is capable of triggering the recoder to switch between at least two recoding tables so that there is no storage overflow,

a second temporary storage device includes a second control/processing unit disposed between the inverse recoder and the sink, and

a second data sink is coupled to the second temporary storage device.

<sup>15</sup>  
45. (Currently Amended) A method for providing for data transmission using a multi-level modulation process, the multi-level modulation process using at least one orthogonal function, the method comprising:

providing a data stream from a data source, wherein a recoder is downstream of the data source;

selecting, using a modulator, signal points of a signal constellation according to at least one respective at least one predetermined and[/or] selected probability so as to optimize a respective at least one signal energy and[/or] a respective signal data rate, the selected signal points each having a defined respective energy, the modulator being connected to an output of the recoder, wherein an input of a transmission channel is coupled to an output of the modulator, and an input of a demodulator is coupled to an output of the transmission channel;

executing, using an inverse recoder, a first operation inverse to a second operation of the recoder;

wherein:

an input of the inverse recoder is coupled to the demodulator,

an input of a data sink is coupled to an output of the inverse recoder,

a temporary storage device is capable of triggering the recoder to switch between at least two recoding tables so that there is no storage overflow, and

a second data source provides the temporary storage with at least one of user data, synchronization data and check data.

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~~16~~  
46. (Previously Presented) The method as recited in claims ~~14~~ or ~~15~~ wherein the output of the modulator is connected in a buffered manner to the input of the transmission channel.

~~17~~  
47. (Previously Presented) The method as recited in claim ~~16~~ wherein the output of the modulator is connected in a buffered manner to the input of the transmission channel via at least one of a temporary register and a buffer.

~~18~~  
48. (Previously Presented) The method as recited in claims ~~14~~ or ~~15~~ wherein at least one source coding process is used for adapting a data sequence of the signal for the using of the at least one orthogonal basis function.

~~19~~  
49. (Previously Presented) The method as recited in claim ~~18~~ wherein the at least one source coding process includes a Huffman method.

~~20~~  
50. (Previously Presented) The method as recited in claims ~~14~~ or ~~15~~ further comprising using a first data source to provide the signal for transmission and using at least one source coding process for adapting a data sequence of the signal for the using of the at least one orthogonal basis function, the at least one source coding process including an error-correcting code adapted to the modulation process and a respective transmission channel for protection against transmission errors, error detection characters of the modulation process being inserted using a second data source.

~~21~~  
51. (Previously Presented) The method as recited in claim ~~20~~ wherein the error-correcting code includes a block code.

~~22~~  
52. (Previously Presented) The method as recited in claim ~~20~~ wherein the error-correcting code includes a convolution code.

~~23~~  
53. (Previously Presented) The method as recited in claims ~~14~~ or ~~15~~ wherein the signal for transmission includes an encrypted input data stream.

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~~54.~~<sup>24</sup> (Previously Presented) The method as recited in claims ~~44~~<sup>14</sup> or ~~45~~<sup>15</sup> further comprising selecting a first data rate for the transmission channel that is greater than a second data rate of the data stream.

~~55.~~<sup>25</sup> (Previously Presented) The method as recited in claims ~~44~~<sup>14</sup> or ~~45~~<sup>15</sup> further comprising transmitting synchronization data during at least one time when no bits are present in the signal for transmission.

~~56.~~<sup>26</sup> (Previously Presented) The method as recited in claims ~~44~~<sup>14</sup> or ~~45~~<sup>15</sup> further comprising transmitting at least one of housekeeping data and user data when no bits are present in the signal for transmission.